Functions of the Respiratory System

• Warm, moisten, and filter incoming air

• Resonating chambers for speech and sound production

• Oxygen and Carbon Dioxide gas exchange (works closely with the circulatory system)
Respiratory Pathway

• Air moves into the body by entering the:
  – Nose or mouth
  – Pharynx
    • Nasopharynx
    • Oropharynx
    • Laryngopharynx
  – (passing the) epiglottis
  – Larynx
  – Trachea
  – Lungs
    • Right and left main bronchi
    • Bronchioles
    • alveoli
Structures of the Respiratory System

Upper respiratory tract
- Nasal cavity
- Pharynx
- Larynx

Lower respiratory tract
- Trachea
- Primary bronchi
- Lungs
Nasal Cavity

- Bony framework, cartilage, skin, hair, and mucous membrane lining
- Nostrils provide openings (also known as nares)
- Septum separates into right and left sides
- Warms, moistens, and filters incoming air, smell, and provides resonating chambers for speech and sound production
  - Mucous moistens and warms the air. It also makes particles in the air stick to the hairs (filters)
  - Chemoreceptors send information to the brain to create scents (sense of smell)
  - The structure of the nasal cavity affects sound production during speech.
Nasal Cavity
Pharynx

- Posterior aspect of the nasal and oral cavities, known as the throat
- Walls composed of skeletal muscle and lined with mucous membranes
- Passageway for both food and air
- Resonating chamber for sounds
- Three sections:
  - Nasopharynx
  - Oropharynx
  - Laryngopharynx
Pharynx

- Nasopharynx
- Oropharynx
- Laryngopharynx
Epiglottis

- Large, leaf-shaped piece of cartilage that covers the larynx during swallowing to prevent food from entering the larynx and trachea

- Opens to allow air to pass through the larynx to the lungs
Larynx (voice box)

- Epiglottis acts as a door to the larynx
- Short passageway connecting the pharynx and trachea
- Made up of
  - Thyroid cartilage
  - Cricoid cartilage
  - Vocal folds (vocal cords)
    - Two sets
      - True vocal cords
        » (make sounds)
      - False vocal cords
Trachea (windpipe)

- Passageway for air
- Located anterior to the esophagus
- Extends from the larynx to the center of the chest where the bronchi branch off
- Supported by cartilage rings to prevent collapse
Bronchi

- Passageway for air to enter the lungs
- Two branches
  - Right Main Bronchus
    - Shorter, wider, and more vertical than left
    - Inhaled objects are more likely to become lodged in
  - Left Main Bronchus
Bronchioles

- Bronchi continue to divide to form smaller tubes called bronchioles
- Passageway for air
Alveoli

- small air sacs on the ends of the bronchioles
- one-cell thick and surrounded by many blood capillaries
- site of gas exchange between air and blood
- they are what makes the lungs look and act like a sponge
Alveoli
Lungs

• Primary organ of the respiratory system
• They fill the thoracic cavity (along with the heart)

• Right lung
  – Has three lobes

• Left lung
  – Has two lobes, which allows room for the heart

• Surrounded by serous membrane called the Pleura
  – Has a visceral and a parietal layer
Diseases and Disorders

Respiratory System
Coryza (Common Cold)

• Caused by one of many viruses
• Signs and symptoms include fatigue, sneezing, coughing, congestion, body aches and pains, and nasal secretions
• Can be treated by medication to reduce discomfort of signs and symptoms
Pneumonia

- Inflammatory illness of the lung
- Lung inflammation and abnormal fluid filling the alveolar
- Caused by bacteria, viruses, fungi, parasites, and chemical or physical injury to the lungs

- Symptoms include cough, chest pain, fever, and difficulty breathing
- Usually treated by antibiotics
Lung Cancer
Lung Cancer

- Disease of uncontrolled cell growth in tissues of the lung
- Growth may lead to invasion of adjacent tissues and infiltration beyond the lungs
- Most common symptoms are shortness of breath, coughing, and weight loss
- Common cause is long term exposure to tobacco smoke
- Treatments include surgery, chemotherapy, and radiation
Asthma

- Reversible obstructive airway disease
- Characterized by periods of coughing, difficulty breathing, or wheezing
- Caused by spasms of the smooth muscle that line the wall of the smaller bronchi and bronchioles
- Treated by antibiotics or the use of an inhaler
Bronchitis

• Inflammation of the bronchi
• Caused by genetics, air pollution, carbon monoxide, respiratory infection, and deficient antibody levels
• Treated by antibiotics
Tuberculosis

- Infectious, communicable disease that destroys the lung tissue and pleura
- Inhaled respiratory droplets spread disease
- Treated with medications
Influenza

• Contagious respiratory illness caused by flu viruses

• Usually comes on suddenly and may include fever, headache, extreme tiredness, dry cough, sore throat, runny or stuffy nose, muscle aches, nausea, vomiting, and diarrhea
Careers

• Pulmonologist
• Respiratory Therapist
• Certified Respiratory Technician
PULMONOLOGIST

• Medical Doctors that diagnose, treat and manage patients with diseases of the lungs and respiratory tract
  – Asthma, pneumonia, emphysema, TB, chest trauma
  – Interpret pulmonary function
  – Pulmonary function test
  – Must complete undergraduate, medical, internship, residency and fellowship
  – $160,000++
Respiratory Therapist

- Assess and treat respiratory and cardiovascular disease
- Skills: airway management, mechanical ventilation, critical care medicine
- **A day and a life with a Respiritory Therapist**
- Complete Associates Degree Program, but Bachelors is preferred for advancement
- $45-65,000
Certified Respiratory Technician

- Work under supervision of Respiratory Therapist
- Administer O2, respiratory treatments, clean and maintain equipment
Vocabulary

- Pneum/o- lung, air or gas
- Rhin/o- nose
- Pulm/o- lung
- COPD- chronic obstructive pulmonary disease
- TLC- total lung capacity
Vocabulary

• Intra- within
• Inter- between
• Peri- around, near
• -ole – small or little
• -stomy – mouth or opening (surgical)
• -phagia – swallowing
• -stenosis – narrowing
• -pnea - breathing
Vocabulary

• Epitaxis- nose bleed
• Septum- cartilage wall between the right and left nostril
• Stridor- squeaking sound made due to constricted bronchioles
• Resonate- to increase intensity or amplify sound
• Aspiration- to inhale unwanted substances into the lungs such as fluid or foreign bodies
• Hyperventilation- excessively rapid breathing causing O2 saturation to decrease
Vocabulary

• Anoxia- lack of oxygen to tissues
• Dyspnea- labored or difficult breathing
• Cyanosis- bluish color of the skin due to lack of oxygen
• Inhalation- drawing air into the lungs
• Exhalation- breathing out
• Ventilation- includes inhalation and exhalation, air moving in and out of the lungs
• Respiration- the gas exchange of oxygen and carbon dioxide
Vocabulary

- **Visceral** - having to do with the organs
- **Parietal (layer)** - layer that does not touch the organ
- **Constriction** - to decrease in diameter
- **Dilation** - to increase in diameter
- **Mucous membrane** - membrane that secretes fluid and has an opening to the outside of the body
- **Serous membrane** - membrane that secretes fluid but does not have an opening to the outside of the body